Globalization of the US: From Digital Research Project to Digital Library Service

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Erika Dowell, Associate Director & Head of Lilly Library Public Services, edowell@indiana.edu, @erikadlibn
Happy Birthday, Nick!
The Project

Konstantin Dierks
Associate Professor of History, IUB

- Teaching
- Book
- Exhibition at Lilly Library, through Dec. 18
- Symposium
- Digital exhibition
- Map
The Funding

Online exhibition & map partially funded by the Office of the Vice Provost of Research at Indiana University-Bloomington through the Collaborative Research and Creative Activity Funding Award.

Additional support for the exhibition & map came from the Lilly Library and from the Wells Library Digital Collection Services.
The People

Digitization and Metadata

Kara Alexander, Digital Media Specialist for Digital Collections Services, IU Libraries
Caitlyn Smallwood, Digital Imaging Specialist for Digital Collections Services, IU Libraries
Peggy Griesinger, Graduate Assistant for Digitization, Lilly Library, IU Libraries, geocoding and metadata
Zachary Downey, Public Services Assistant, Lilly Library, IU Libraries, digital photography
Carson Day, Photographer, Lilly Library, Indiana University Libraries, digital photography
The People

Development and Design

Shaun Akhtar, Cataloging and Metadata Specialist II, Dartmouth College Library
Lynn Carlson, GIS/Systems Manager, Geological Sciences, Brown University
Bryan Brown, Geospatial Web Developer for Digital Collections Services, IU Libraries
Will Cowan, Head, Software Development, Library Technologies, IU Libraries
Laura Pence, Designer, Indiana University
Brianna Marshall, Digital Library Research Assistant for Digital Collections Services, IU Libraries
Shayna Pekala, Graduate Assistant for Digital Collections Services, IU Libraries
Siobhain Rivera, Graduate Assistant for Digital Collections Services, IU Libraries
The Map
Map Requirements

- Support display of historical maps
- Plot multiple facets/data categories
  - Markers (points on a map)
  - Shapes (polygonal regions)
- Display contextual information (metadata)
- Navigate the map via facets and a timeline
<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Start Year</th>
<th>End Year</th>
<th>Date Range</th>
<th>Historic Location</th>
<th>Present Location</th>
<th>Present Lat</th>
<th>Present Lon</th>
<th>GeoJSON</th>
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<tbody>
<tr>
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<td>Treaty of Peace, Friendship, Commerce, and Navigation</td>
<td>1880</td>
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<td>All treaty years: 1880</td>
<td>Brunei</td>
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<td>(historical Prussia)</td>
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<td></td>
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<td>Oldenburg</td>
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<td></td>
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<td>Algiers</td>
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<td>Treaty for the Free Navigation of the Rivers Parana and Uruguay</td>
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<td>All treaty years: 1883</td>
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</tbody>
</table>
Map Metadata

- Geocoding
  - Historical versus Present-Day Locations
    - DragTool
  - Markers
    - GPS Visualizer
  - Shapes
    - GeoJSON.io (for KML output)
    - Ogre (for GeoJSON output)
Map Experimentations

● Lots of littles
  ○ little cash
  ○ little to no GIS expertise
  ○ no web developers (until later, then only a few hours per week)

● But a whole lotta labor of love
Simile Exhibit

https://github.com/simile-widgets/exhibit
Google Fusion

http://tables.googlelabs.com/
Neatline

See #dlbb presentation given by Brianna Marshall, Digital Curation Coordinator at University of Wisconsin-Madison Libraries, in March 2014: http://hdl.handle.net/2022/17377

● Using Neatline in a way that was not intended
  ○ Issues with loading georectified maps (projections)
  ○ Conflicting geo-standards (KML v. WKT)

● Worth revisiting for:
  ○ detailed annotations
  ○ highlighting or making explicit patterns in the data

http://neatline.org
Map Solution: Leaflet!
Implementing Leaflet

http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.js
http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.css
Implementing Leaflet Marker Cluster Javascript Function =>

```
(function($) {
    L.MarkerClusterGroup = L.FeatureGroup.extend(
        options: {
            maxClusterRadius: 80,
            iconCreateFunction: null,
            spiderfyOnMaxZoom: true,
            showCoverageOnMap: true,
            zoomToBoundsOnClick: true,
            singleMarkerMode: true,
            disableClusteringOnMapTap: true,
            removeDivisibleVisibleBounds: true,
            spiderfyDistanceMultiplier: 1,
            chunkedLoading: false,
            chunkInterval: 200,
            chunkDelay: 50,
            chunkProgress: null,
            polyendPoints: [],
            clusterClass: "" // New option for selecting categorical color coding
        },
        initialize: function() {
            L.Util.setOptions(this, o);
            // this.options.iconCreateFunction = this._defaultIconCreateFunction
            this.featureGroup = L.featureGroup();
            this.featureGroup.on(L.FeatureGroup.EVENTS, this._propogateEvent, this);
            this.nonPointGroup = L.featureGroup();
            this.nonPointGroup.on(L.FeatureGroup.EVENTS, this._propogateEvent, this);
            this._needsClustering = false;
            this._needsShaking = false;
            this._currentshownBounds = null;
            this._result = [];
            this.addLayers = function(t) {
                var layerGroup = L.featureGroup()
                var i = 0;
                for (var e in e.layers) {
                    e.push(e.layers)
                }
                return this.addLayers()  // Return this._addLayers()
            }
            if (ttLatLng) {
                this.nonPointGroup.addLayer();
                return this
            }
            if (this_map) {
                this._needsClustering.push();
                return this
            }
        }
    });
})(jQuery);
```
# Implementing Leaflet

## settings.py

```python
# App's location/URL
app_path = "http://www.indiana.edu/~kdglobal/worldmap-dev/"

# Link to Google Doc (Make sure the correct gdoc_id is active
# so that the correct spreadsheet is pulled from)
gdoc_id = "10qULnCybfQJ50y9Tjb0LvLPaQzB6HkBnasuJh-9_EE" # Main

gdoc_id = "17EabushwW8xGeN0wNBAJp2E97e2t8k725m-G7eq9mk" # Dev

# Refresh style.js? Must be True or False (capitalized)
style_refresh = True

# Size of custom icons (width, height in pixels)
icon_size = "30, 50"

# Anchor point (position of icon relative to point it is marking)
icon_anchor = "15, 0"

# initial lat/long coordinates for map center
init_center = [20, -35]

# initial zoom level
init_zoom = 2

# maximum zoom
max_zoom = 5

# minimum zoom
min_zoom = 2
```

## style.js

```javascript
// Overseas Marine Landings marker icon and shape styling
var OverseasMarineLandingsIcon = L.icon(
  iconSize: [30, 50], // icon height/width in pixels
  iconAnchor: [15, 0], // point where icon corresponds to marker's location
  popupAnchor: [0, 0] // point from which the popup should open relative to the iconAnchor
);  

var OverseasMarineLandingsShapeStyle = {
  'color': '#0000ff',
  'weight': 1,
  'opacity': 1
};

// Overseas Navy Personnel icon and shape styling
var OverseasNavyPersonnelIcon = L.icon(
  iconSize: [30, 50], // icon height/width in pixels
  iconAnchor: [15, 0], // point where icon corresponds to marker's location
  popupAnchor: [0, 0] // point from which the popup should open relative to the iconAnchor
);  

var OverseasNavyPersonnelShapeStyle = {
  'color': '#0000ff',
  'weight': 1,
  'opacity': 1
};

// Foreign Military Actions marker icon and shape styling
var ForeignMilitaryActionsIcon = L.icon(
  iconUrl: "http://www.indiana.edu/~kdglobal/worldmap-dev/images/ForeignMilitaryActions.png",
  iconSize: [30, 50], // icon height/width in pixels
  iconAnchor: [15, 0], // point where icon corresponds to marker's location
  popupAnchor: [0, 0] // point from which the popup should open relative to the iconAnchor
);  

var ForeignMilitaryActionsShapeStyle = {
  'color': '#0000ff',
  'weight': 1,
  'opacity': 1
};
```
Implementing Leaflet

<table>
<thead>
<tr>
<th>Present Location</th>
<th>Present Lat</th>
<th>Present Lon</th>
<th>GeoJSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>(on Borneo island)</td>
<td>4.8903399</td>
<td>114.9420013</td>
<td>{&quot;type&quot;: &quot;FeatureCollection&quot;, &quot;crs&quot;: { &quot;type&quot;: &quot;name&quot;, &quot;properties&quot;: { &quot;name&quot;: &quot;esri:900913&quot; } }, &quot;features&quot;: [ { &quot;type&quot;: &quot;Feature&quot;, &quot;geometry&quot;: { &quot;type&quot;: &quot;Point&quot;, &quot;coordinates&quot;: [114.9420013, 4.8903399] } } ] }</td>
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<tr>
<td>(historical Prussia)</td>
<td>52.5014076</td>
<td>13.4023285</td>
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<tr>
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<td>13.4023285</td>
<td>{&quot;type&quot;: &quot;FeatureCollection&quot;, &quot;features&quot;: [ {&quot;type&quot;: &quot;Feature&quot;, &quot;geometry&quot;: { &quot;type&quot;: &quot;Point&quot;, &quot;coordinates&quot;: [13.4023285, 52.5014076] } } ] }</td>
</tr>
</tbody>
</table>

Source: Miller, Hunter. Treaties and Other International Acts of the United States of America. [URLs provided]
Implementing Leaflet

Type
- Marker (uses lat/lon)
- Map (URL for each map)
- Shape (uses GeoJSON)

Category/Subcategory
- Legend
- Markers on the map

Start / End Year
- Timeline functionality

Sources
- Linked to fulltext versions in HathiTrust, Internet Archive, Google Books
Implementing Leaflet

- Dynamically generates all the Javascript data that Leaflet uses and displays
  - automatically backing up previous data
  - generates markers based on data type (marker or shape)
  - checks to use “historical lat/lon” over present, if populated
- Defines all kinds of functionality
  - initializes map
  - adds and removes layers based on year in the timeline
  - integrates marker cluster functionality with timeline
  - Sets basemaps (to change based on year)
  - and more!

https://github.com/globalization-of-the-united-states/gotus
Challenges: Shapes
Challenges: Routes

Screengrab courtesy of https://leanpub.com/leaflet-tips-and-tricks/
## Challenges: Metadata

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<thead>
<tr>
<th>File Name</th>
<th>Author</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization Metadata Unified Template (Production, Frozen Version)</td>
<td>Konstantin Dierks</td>
<td>11:41 PM</td>
</tr>
<tr>
<td>Globalization Metadata Unified Template (Development)</td>
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<tr>
<td>Globalization Metadata Unified Template (Staging, Working Version)</td>
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<td>11:41 PM</td>
</tr>
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</table>
Kon’s New Frontiers Grant (known by mid-January 2015)

- **metadata compilation** to ensure structured and consistent capture of descriptive information, which serves and will continue to serve as the source for spatial and temporal visualizations necessary for this digital research project.
- **Digitization and geo-rectification of a set of 73 historical maps** that reflect the ever-changing world between 1789 and 1861 that will be packaged and shared for scholarly re-use and consumption.
- **Codification of data curation best practices** for the preservation of the geospatial and descriptive data and metadata that Professor Dierks has been meticulously collecting, including procedures and protocols for storing the data in a repository like IUScholarWorks, and, as equally important, procedures and protocols for providing other scholars access to this data and metadata for use in their own research.
- **Guidance and oversight for the next phase of web development to extend the interactive mapping component** that is built using an open-source, extensible platform known as Leaflet in order to create generalized mapping functionality for re-use by other scholars on the Bloomington campus and beyond interested in historical, map-based data visualizations.

Professor Eric Sandweiss, Professor and Chair of the Indiana University History Department

- Pending funding of CIC Global Midwest grant led by Eric and colleagues, we will put this framework to the test.
Yay!

http://cuteoverload.com